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REMARKS

Claims 1-17 are pending in the present application. Reconsideration and allowance of the present application in view of the above amendments and the following remarks is respectfully requested.

Amendments to the Specification and Claims

By this response Applicant has amended the specification and claims 1, 6, 15, and 16 to replace the term "capacity" with "capacitance." It would be understood by one of ordinary skill in the art that these terms would be equivalent.

Claim Rejections – 35 USC § 102

The Examiner has rejected claims 1, 3, 6-11, 13, and 15-17 under 35 U.S.C. §102(b) as being allegedly anticipated by United States Patent No. 5,894,091 to Kubota ("Kubota"). Applicant respectfully traverses this rejection.

By this response, Applicant has amended claim 1 to recite that "each of the plurality of mono-axial sensors includes a plurality of the beams and a weight, which are independent of other mono-axial sensors;" have amended claim 6 to recite that "each of the plurality of sensor elements includes a plurality of the beams and a weight, which are independent of other of the plurality of sensor elements;" and have amended claim 9 to recite that "the first mono-axial sensor element includes a first plurality of beams and a first weight, which are independent of the second mono-axial sensor element," and that "the second mono-axial sensor element includes a second plurality of beams and a second weight, which are independent of the first mono-axial sensor element." Support for these amendments can be found, for example, in Applicant's FIGs. 1A and 1B, and on page 5, lines 16-22, of Applicant's specification.

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As shown in FIGs. 1A and 1B, a mechanical quantity sensor includes at least two sensor chips 100a, 100b, each having the same characteristics, so that the sensor output is increased while the noise component remains unchanged. Each of these sensor chips 100a, 100b includes a weight 3 and a plurality of beams 4. And an examination of FIGs. 1A and 1B will show that the weight 3 and beams 4 in the first sensor chip 100a are independent of the weight 3 and beams 4 of the second sensor chip 100b. By having two (or more) independent sensors arranged, the sensor output is increased without changing the signal-to-noise ratio.

In contrast, Kubota discloses a composite sensor in which multiple fixed electrodes A-F and a single movable electrode G are arranged to face one another in a parallel relationship forming variable capacitors of the parallel plate-type. (See, e.g., Kubota, column 4, lines 38-52, and FIGs. 1B.) However, each of the variable capacitors J_1 - J_4 / K_1 - K_4 formed in Kubota use the same movable electrode G.

The Examiner has interpreted the device disclosed in Kubota as showing the sensor recited in independent claims 1, 6, and 9 including a plurality of variable capacitors J_1 - J_4 / K_1 - K_4 each including one of the fixed electrodes A-F, and the single movable electrode G. However, this does not disclose "a plurality of mono-axial sensors arranged in the same direction for detecting a mono-axial mechanical quantity based on capacitances among fixed electrodes and moving electrodes coupled to beams that are capable of undergoing displacement depending upon the acceleration, wherein each of the plurality of mono-axial sensors includes a plurality of the beams and a weight, which are independent of other mono-axial sensors," as recited in claim 1. Likewise it does not disclose "a plurality of sensor elements, each having fixed electrodes secured to said semiconductor substrate and moving electrodes coupled to beams, wherein the moving electrodes are capable of being displaced depending upon the acceleration, to detect acceleration based on capacitances among said fixed electrodes and said moving electrodes;

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wherein each of the plurality of sensor elements includes a plurality of the beams and a weight, which are independent of other of the plurality of sensor elements," as recited in claim 6. Nor does it disclose "a first mono-axial sensor element oriented in a first direction for detecting a first mechanical quantity and generating a first output signal indicating the first mechanical quantity; and a second mono-axial sensor element oriented in the first direction for detecting a second mechanical quantity and generating a second output signal indicating the second mechanical quantity, wherein the first mono-axial sensor element includes a first plurality of beams and a first weight, which are independent of the second mono-axial sensor element, wherein the second mono-axial sensor element includes a second plurality of beams and a second weight, which are independent of the first mono-axial sensor element," as recited in claim 9.

In particular, nothing in Kubota discloses independent sensors having independent beams and weights. Therefore, Kubota fails to disclose these newly-recited features of claims 1, 6, and 9.

Claims 3, 7, and 8 depend from claim 1 and are allowable for at least the reasons given above for claim 1. Claims 10, 11, 13, and 15-17 all ultimately depend from claim 9 and are allowable for at least the reasons given above for claim 9.

Based on at least the arguments set forth above, Applicant respectfully submits that claims 1, 3, 6-11, 13, and 15-17 are not anticipated by Kubota. Applicant therefore requests that the Examiner withdraw the rejection of claims 1, 3, 6-11, 13, and 15-17 under 35 U.S.C. §102(b) as being allegedly anticipated by Kubota.

Claim Rejections – 35 USC § 103

The Examiner has rejected claims 2, 4, 5, 12, and 14 under 35 U.S.C. §103(a) as being allegedly unpatentable over Kubota.

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Claims 2, 4, and 5 depend from claim 1 and are allowable for at least the reasons given above for claim 1. Claims 12 and 14 depend from claim 9 and are allowable for at least the reasons given above for claim 9. What Kubota does not disclose above, it also does not suggest.

In particular, nothing in Kubota suggests that individual sensors be used having independent weights and beams.

Furthermore, claims 2 recites that the "plurality of mono-axial sensors are formed on different semiconductor substrates," while claim 9 recites that "the first and second mono-axial sensors are formed on different semiconductor substrates." Since the variable capacitors J_1 - J_4 / K_1 - K_4 in Kubota are all formed using the same movable electrode G, it would not be obvious to form different capacitors on different semiconductor substrates.

In addition, claim 4 recites that the "plurality of mono-axial sensors are formed to be stacked on a common semiconductor substrate or on a mother substrate," while claim 14 recites that "the first and second mono-axial sensors are stacked vertically on one of: a common semiconductor substrate and a mother substrate." Since the variable capacitors J_1 - J_4 / K_1 - K_4 in Kubota are all formed using the same movable electrode G, it would not be obvious to form one capacitor on a common semiconductor substrate and another on a mother substrate.

Likewise, claim 5 recites that the "plurality of mono-axial sensors are formed on both surfaces of a common semiconductor substrate or of a mother substrate." Since the variable capacitors J_1 - J_4 / K_1 - K_4 in Kubota are all formed using the same movable electrode G, it would not be obvious to form one capacitor on one surface of a common semiconductor substrate or a mother substrate, and another capacitor on another side of the common semiconductor substrate or the mother substrate.

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Based on at least the arguments set forth above, Applicant respectfully submits that claims 2, 4, 5, 12, and 14 are not rendered obvious by Kubota. Applicant therefore requests that the Examiner withdraw the rejection of claims 2, 4, 5, 12, and 14 under 35 U.S.C. §103(a) as being allegedly unpatentable over Kubota.

Conclusion

In view of the foregoing, the Applicant respectfully submits that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the examiner is invited to contact the undersigned by telephone.

Please charge any unforeseen fees that may be due to Deposit Account No. 50-1147.

Respectfully submitted,



Brian C. Altmiller
Reg. No. 37,271

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Posz & Bethards, PLC
11250 Roger Bacon Drive, Suite 10
Reston, VA 20190
Phone 703-707-9110
Fax 703-707-9112
Customer No. 23400